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## PART I - ADMINISTRATIVE

### Section 1. General administrative information

Title of project

Trout Creek Habitat Restoration Project    Multi Year Funding Proposal

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BPA project number: 9404200

Contract renewal date (mm/yyyy):

☒ Multiple actions?

Business name of agency, institution or organization requesting funding

Oregon Department of Fish and Wildlife

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Business acronym (if appropriate)

ODFW

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Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses

7.1, 7.1D, 7.1D.1, 7.1D.2, 7.6, 7.6A, 7.6A.2, 7.6B.1, 7.6B.2, 7.6B.3, 7.6B.6, 7.7, 7.10.K.1 AND FROM  
SCIENTIFIC REVIEW: 2,21,22,28,29

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FWS/NMFS Biological Opinion Number(s) which this project addresses

Although there has not yet been a final decision regarding the petition to list Mid Columbia River ESU Steelhead. This project would help address "Biological Option" determinations related to habitat and natural production of summer steelhead .

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Other planning document references

Edlund R. and C. Penhollow. 1996. Trout Creek Watershed Resource Inventory, Problem Assessment and Treatment Alternatives. Jefferson County Soil and Water Conservation District. 46-84.

Columbia River Intertribal Fish Commision. 1996. Wy-Kan-Ush-Mi Wa-Kish-Wit Spirit of the Salmon The Columbia River Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs, and Yakima Tribes. Volume II p38.

Oregon Department of Fish and Wildlife. 1997. Lower Deschutes River Subbasin Management Plan. 1-24-5 and 1-34

Northwest Biological Consulting 1983. Trout Creek Restoration. Project No. 83-423. Phase 1 Final Report. Bonneville Power Administration, Portland, Oregon. p15-18

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Short description

Operation and Maintenance of instream and riparian habitat improvement; Monitoring and Evaluation of Basin SSSt smolt production and habitat recovery; coordination for basin long range plan; resulting in increased native salmonid and wildlife production.

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**Target species**

Summer Steelhead, Redband Trout, Pacific Lamprey

**Section 2. Sorting and evaluation****Subbasin**

Deschutes River

**Evaluation Process Sort**

<b>CBFWA caucus</b>	<b>Special evaluation process</b>	<b>ISRP project type</b>
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input checked="" type="checkbox"/> Anadromous fish <input type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Multi-year (milestone-based evaluation) <input type="checkbox"/> Watershed project evaluation	<input type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input checked="" type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input type="checkbox"/> Research & monitoring <input type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

**Section 3. Relationships to other Bonneville projects*****Umbrella / sub-proposal relationships.*** List umbrella project first.

<b>Project #</b>	<b>Project title/description</b>
9306600	Oregon Screens
9303000	Buckhollow watershed restoration
9405420	Bull Trout studies

***Other dependent or critically-related projects***

<b>Project #</b>	<b>Project title/description</b>	<b>Nature of relationship</b>
9304000	Fifteenmile Cr.habitat restoration	Share equipment and manpower

**Section 4. Objectives, tasks and schedules*****Past accomplishments***

<b>Year</b>	<b>Accomplishment</b>	<b>Met biological objectives?</b>
1998	To date we have built and maintained 132 miles of fence	Established riparian protection on 58% of available steelhead habitat. Working towards bank stabilization and stream shading goals.
1998	conducted SSt smolt monitoring	Estimated 73,000 smolts.
1998	To date we have built and maintained 236 Rock weirs.	Diversified habitat on 13% of available steelhead habitat. Working towards

		habitat diversification goal.
1998	To date we have built and maintained 189 log weirs.	Diversified habitat on 13% of available steelhead habitat. Working towards habitat diversification goal.
1998	To date we have placed and maintain 3.7 miles of Juniper riprap.	Physically stabilized 9% of eroding stream bank. Working towards bank stabilization goal.
1998	To date we have placed 3397 habitat boulders.	Diversified habitat on 13% of available steelhead habitat. Working towards habitat diversification goal.
1998	To date we have placed 498 pieces of LWD.	Diversified habitat on 13% of available steelhead habitat. Working towards habitat diversification goal.
1998	Facilitated COE to conduct an initial assessment to removal of 1964 berms in the basin.	This will help in achieving several sub-basin wide goals.
1998	Facilitated and completed basin habitat survey.	Monitoring to determine progress towards goals.
1998	Developed and maintain 6 off channel water developments	Working towards bank stabilization and stream shading goals.

### ***Objectives and tasks***

<b>Obj 1,2,3</b>	<b>Objective</b>	<b>Task a,b,c</b>	<b>Task</b>
1	To promote bank stability and vegetation regrowth.	a	Annually inspect all riparian fencing. Depending on livestock, wildlife, weather and other factors inspect riparian fencing with heavy livestock pressure at least once a week. Repair damage immediately or as soon as feasible.
		b	Work with the COE to reestablish natural sinuosity by removal of 1964 berms.
2	Provide unobstructed passage for migration of adult and juvenile summer steelhead to achieve full utilization of available habitat.	a	Work with the private landowners in the basin to remove gravel push up dams in the basin.
3	Increase instream habitat diversity.	a	Annually inspect all instream and bank stabilization structures. Repair structures as needed.
4	Document stream temperature changes attributable to riparian and instream channel recovery.	a	Monitor stream temperatures at 22 sites throughout the basin. Both above and below riparian exclosures.
5	Determine basin and sub-basin summer steelhead smolt outmigration.	a	Operate trap in the basin to monitor smolt outmigration.
6	Amend long range restoration plan for the Trout Creek watershed. Inclusive will be areas of critical habitat for SSt., and integration of currently accepted restoration methods for both riparian and uplands to continue expansion SSt.	a	Coordinate and facilitate long range basin planning with SWCD and Trout Creek Watershed council.

	production.		
		b	Utilize existing manpower to continue leveraging existing BPA funds with other funds to accomplish additional basin wide goals.
		c	Work with the Trout Creek Watershed council and Private landowners to develop projects and to locate additional funding sources.
7	Reduce poaching mortality on adult and juvenile SST. Reduce fill and removal and other habitat violations.	a	Subcontract with Oregon State Police to enhance trooper presence in the basin during vulnerable periods for summer steelhead.
8	Maximize instream flows during irrigation season.	a	Subcontract with Water Resources to enhance monitoring of water withdrawals.
		b	Subcontract with Water Resources to investigate more efficient methods of water delivery to water users.

### ***Objective schedules and costs***

<b>Obj #</b>	<b>Start date mm/yyyy</b>	<b>End date mm/yyyy</b>	<b>Measureable biological objective(s)</b>	<b>Milestone</b>	<b>FY2000 Cost %</b>
1	8/2000	7/2001	Maintain progress and continue to lower summer stream temperature and reduce sediment thereby increasing egg to smolt survival of target species.		32.00%
2	8/2000	7/2001	Provide unobstructed fish passage.		8.00%
3	8/2000	7/2001	Maintain increases in stream habitat complexity.		37.00%
4	8/2000	7/2001	Evaluate effects of obj. 1 and 2.		1.50%
5	8/2000	7/2001	Monitor smolt production and location of smolts to direct further conservation efforts.		8.50%
6	8/2000	7/2001	Further develop the basin plan based on 1998 stream survey and Obj. 4.		2.00%
7	8/2000	7/2001	Locate funding for objective 5.		1.00%
8	8/2000	7/2001	Reduce mortality due to poaching of summer steelhead adults and smolts in conjunction with better enforcement the fill and removal laws		5.00%
9	8/2000	7/2001	Assist water users in improving efficiency of water use.		5.00%
				<b>Total</b>	100.00%

## Schedule constraints

### Completion date

The last riparian leases on Trout Creek expire in 2009.

## Section 5. Budget

**FY99 project budget (BPA obligated):** \$297,050

### ***FY2000 budget by line item***

<b>Item</b>	<b>Note</b>	<b>% of total</b>	<b>FY2000</b>
Personnel	The next three amounts include M&E, Long Rang planning and Project coordination	%8	31,891
Fringe benefits	OPE	%3	12,437
Supplies, materials, non-expendable property		%0	1,250
Operations & maintenance	This includes personnel OPE and supplies associated with O&M	%49	184,805
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Replacement of 2 14 year old ATVs that currently require extensive maintenance, and 5 Solar pumps.	%6	22,250
NEPA costs		%0	
Construction-related support		%0	
PIT tags	# of tags:	%0	
Travel		%0	
Indirect costs	@ 35.5%	%21	81,786
Subcontractor	Oregon State Police 0.25 FTE	%6	21,850
Subcontractor	Ore. Water Resources Tech (6mo)	%6	24,428
Other		%0	
<b>TOTAL BPA FY2000 BUDGET REQUEST</b>			<b>\$380,697</b>

### ***Cost sharing***

<b>Organization</b>	<b>Item or service provided</b>	<b>% total project cost (incl. BPA)</b>	<b>Amount (\$)</b>
Conservation Resource Program	Resting of erodable soils in the basin	%8	153,000
NRCS	EQUIP Land conservation practices	%5	100,000
USFS	new culverts and road obliteration	%17	320,000
Trout Creek Watershed council	Stream restoration	%8	150,000
Corps of Engineers	Stream restoration and berm removal	%16	300,000
GWEB	Stream restoration	%8	152,000
		%0	
NRCS	Engineering and Farm plans	%4	75,000

ODFW	NMFS fish screening and passage	%8	150,000
Landowners	in kind services	%3	54,000
Jefferson County	Bridge and stream bank repair	%4	75,000
<b>Total project cost (including BPA portion)</b>			<b>\$1,909,697</b>

### ***Outyear costs***

	<b>FY2001</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
<b>Total budget</b>	\$389,800	\$361,108	\$307,991	\$308,000

## **Section 6. References**

<b>Watershed?</b>	<b>Reference</b>
<input type="checkbox"/>	Ames, C.R. 1977. Wildlife conflicts in riparian management: Grazing. In : Importance, Preservation and Management of Riparian Habitat. USDA Forest Serv. Gen. Tech. Rep. RM-43:39-51
<input type="checkbox"/>	Armour, C.L., D.A. Duff, and W. Elmore. 1991. The effects of livestock grazing on riparian and stream ecosystems. Fisheries 16:7-11.
<input type="checkbox"/>	Behnke, R.J. and R.F. Raleigh. 1978. Grazing and the riparian zone: Impact and management perspectives. P184-189. In: Strategies for Protection and Management of Floodplain Wetlands and Other Riparian Ecosystems. USDA Forest Serv. GTR-WO-12
<input type="checkbox"/>	Beschta, R.L., W.S. Platts, J.B. Kauffman, and M.T. Hill. 1994. Artificial stream restoration-money well spent, or and expensive failure? Universities Council on Water Resources Annual Conference, Big Sky Montana, 2-5 August 1994. University of Illinois,
<input type="checkbox"/>	Bryant, F.T., R.E. Blaser, and J.R. Peterson. 1972. Effect of trampling by cattle on bluegrass yield and soil compaction of a Meadowville Loam. Agron. J. 64:331-334
<input type="checkbox"/>	Cairns, J. Jr. 1993. Is restoration ecology practical? Restor. Ecol. 1:3-6.
<input type="checkbox"/>	Davis, J.W. 1982. Livestock vs. riparian habitat management there are solutions. P175-184. In: Wildlife-Livestock Relationships Symposium: Proc. 10. Univ. of Idaho Forest, Wildlife and Range Exp. Sta. Moscow.
<input type="checkbox"/>	Evans, Keith E., and Rodger R. Krebs. 1977. Avian use of livestock watering ponds in western South Dakota. USDA Forest Serv. Gen. Tech. Rep. RM-35.
<input type="checkbox"/>	Everest, F.H., and W.R. Meehan. 1981. Forest management and anadromous fish habitat productivity: Tran. 46th North Amer. Wildlife and Natural Resource Conf. 1981 Wildlife Mgmt. Inst. Wash., D.C.
<input type="checkbox"/>	Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conserv. Bio. 8:629-644.
<input type="checkbox"/>	Green, D.M. and J.B. Kauffman. 1995 Succession and livestock grazing in a Northeast Oregon riparian ecology. J. Range Manage. 48:307-313.
<input type="checkbox"/>	Gunderson, D.R. 1968. Floodplain use related to stream morphology and fish populations. J. Wildl. Manage. 32:507-514
<input type="checkbox"/>	Johnson, D.R., H.L. Gary, and S.L. Ponce. 1978. Range cattle impacts on stream water in the Colorado Front Range. USDA Forest Serv. Res. Note RM-359
<input type="checkbox"/>	Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and stream management implications: a review. J. Range Manage. 37:430-437.
<input type="checkbox"/>	Kauffman J.B., R.L. Beschta, N. Otting, and D. Lytjen. 1997. An ecological perspective of riparian and stream restoration in the Western United States. Fisheries. Vol.22 No.5 p12-24
<input type="checkbox"/>	Knoph, F.L., and R.W. Cannon. 1982. Structural resilience of a willow riparian community to changes in grazing practices. P. 198-209. In: Wildlife-Livestock Relationships Symposium: Proc. 10. Univ. of Idaho Forest, Wildlife and Range Exp. Sta. Moscow, Id
<input type="checkbox"/>	Marcuson, P.E. 1977. The effect of cattle grazing on a brown trout stream in Rock Creek, Montana. Fish and Game Fed Aid Pro. F-20-R-21-11a

<input checked="" type="checkbox"/>	Northwest Biological Consulting 1983. Trout Creek Restoration. Project No. 83-423. Phase 1 Final Report. Bonneville Power Administration, Portland, Oregon.
<input type="checkbox"/>	Oregon-Washington Interagency Wildlife Council. 1978. Managing riparian zones for fish and wildlife in eastern Oregon and eastern Washington. Unpub.
<input type="checkbox"/>	Platts, W.S. 1979. Livestock grazing and riparian stream ecosystems. P. 39-45. In Proc., Forum-Grazing and Riparian Stream Ecosystems. Trout Unlimited, Inc.
<input checked="" type="checkbox"/>	Platts, W.S. 1981. Influences of forest and rangeland management on anadromous fish habitat in western North America. Effects of livestock grazing. USDA Forest Serv. Gen Rep. PNW-124.
<input type="checkbox"/>	Platts, W.S. 1991. Livestock grazing. P. 389-483 in Influences of forest and rangeland management on salmonid fishes and their habitats. Am. Fish. Soc. Spec. Publ. 19, Bethesda, Md.
<input checked="" type="checkbox"/>	Pond, F.W. 1961. Effects of three intensities of clipping on the density and production of meadow vegetation. J. Range Manage. 14:34-38.
<input type="checkbox"/>	Rauzi, F., and C.L. Hanson. 1966. Water intake and runoff as affected by intensity of grazing. J. Range Manage. 19:351-356.
<input checked="" type="checkbox"/>	Trout Creek Watershed Analysis Report, 1995. USDA Forest Serv. Ochoco National Forest
<input type="checkbox"/>	

## PART II - NARRATIVE

### Section 7. Abstract

Trout Creek provides spawning and rearing habitat for up to 90% of the "east side" steelhead life history in the Dechutes River. This habitat is significant in maintaining the specific life history patterns of wild steelhead in the Deschutes River. This life history may have once been the most abundant life history when the Crooked River was available.

In the early 1980's the Trout Creek Sub-basin was described as "unraveling". Landowners were complaining that they were losing more and more acres of fields to the creek. In 1983 Buell and Associates conducted a comprehensive physical habitat survey of the sub-basin. The survey found that there was poor riparian cover, large amounts of eroding banks, and low instream habitat diversity. Cost benefit analysis (also done by Buell and Assoc.) determined stream reaches that would demonstrate the best recovery of instream habitat. Consultants and engineers then developed restoration plans for the reaches that met the cost benefit analysis. This came complete with detailed schematics of individual structures at each site.

The Trout Creek Project is an operating "on the ground" project that has followed the restoration plan developed in 1983. Livestock riparian exclosures on over 70 stream miles (58% of available steelhead habitat) has benefited stream bank integrity and has contributed to increased riparian vegetation density, health, and vigor. Installation of several thousand instream structures within the Trout Creek sub-basin has also served to decrease actively eroding streambanks and has contributed to increasing the instream habitat complexity. **The overall goal of the project is to increase native summer steelhead smolt outmigrant populations to 100,000 annually, which will be monitored annually through smolt trapping.** This goal will be accomplished through continued maintenance of completed habitat restoration work, gaining a better understanding of the amount and timing of water withdrawal, and a increased law enforcement presence to reduce environmental violations and poaching of adult and smolting steelhead. Long range sub-basin planning will serve to reevaluate and concentrate activity on remaining limiting factors in the sub-basin. Also by restoring the riparian and instream habitat this project is also benefiting numerous wildlife species. It is believed that the riparian /streamside ecosystem is the single most productive type of wildlife habitat, benefiting the greatest number of species (Kauffman and Krueger, 1984).

**Year 2000 project tasks are 1) continuing to maintain and repair the existing structures and fencing. 2) Work with the interested parties in the sub-basin to leverage BPA funds with other granting sources to accomplish additional sub-basin wide habitat enhancement projects. 3) Increase effort to monitor and regulate water usage in diversions and to monitor stream flows will be conducted by Water Resources, and 4) An enhanced presence of State Police to assist in the reduction of poaching on adult and juvenile steelhead, habitat conservation and enforcement of fill and removal laws. The watershed approach will be used to achieve the goal of 100,000 native smolts produced annually in the basin. Also benefiting from the sub-basin restoration will be native resident redband trout and the multitude of wildlife species that are dependent on riparian areas.**

The expected outcome of this project is to reduce fine sediment input, increase riparian shading, reduce summer stream temperatures, improve instream habitat complexity, and increase late season flows. As a result of these measures it is expected that steelhead, resident redband trout and several wildlife species will increase in numbers. The time frame for the desired outcome for each habitat component is variable. Some areas of the project have already made marked improvement, however there are some areas both inside and outside the leased areas that will need either more time for recovery, or some additional type of restoration effort (this includes addressing problems in the uplands). These areas will be identified in the 1998 stream physical habitat survey. Areas that are in need of recovery outside of the BPA riparian leased ground are being addressed via the Trout Creek long-range Plan. Trout Creek Project Asst. Project Leader is taking the lead in developing this plan. Additional projects inside and outside the riparian leased areas will be identified as to causative factors and appropriate methods for habitat restoration techniques. Any potential funding sources will be investigated and cost-sharing opportunities thoroughly explored.

## **Section 8. Project description**

### **a. Technical and/or scientific background**

Trout Creek is the largest eastside tributary in the Deschutes River below Pelton Dam, entering the Deschutes at river mile 88.5. For the past 125 years the Trout Creek Sub-basin has been severely degraded by intensive livestock, agricultural, and timber management practices. In reaches where there is heavy irrigation withdrawal, and poor riparian habitat stream temperatures can reach 31°C (ODFW unpublished data, 1996). Historically the Trout Creek sub-basin supported Chinook, steelhead and resident redband populations. In 1981 the sub-basin only supported a run of about 250 adult summer steelhead (USBR, 1981). The degraded habitat of Trout Creek has been the primary factor for the declining production of salmonids (Northwest Biological Consulting, 1983). There are approximately 140 stream miles in the watershed and about 85% of those miles have riparian problems. There is potential for improvement with rehabilitation on about 120 stream miles (U.S. Fish and Wildlife Service and National Fish and Wildlife Service, 1981). Cattle grazing appeared to be a significant limiting factor for riparian vegetation (NBC, 1983). Livestock grazing has been perhaps the most prevalent cause of ecological degradation for many western riparian and stream ecosystems (Kauffman and Krueger 1984, Kauffman 1988, Fleischner 1994). After extensive field reviews of fish habitat improvement projects in eastern Oregon Beschta et. al. (1991) and Kauffman et al. (1993) concluded that the cessation of livestock grazing in riparian zones in eastern Oregon was the single most ecologically effective approach to restoring salmonid habitats.

Restoration efforts on these areas would probably make Trout Creek one of the highest producers of wild anadromous stocks for the lower Deschutes River. Since the Deschutes river supports several of the largest remaining stocks of wild runs of anadromous fish in eastern Oregon, the significance of Trout Creek is further emphasized (NBC, 1983). **In 1998 this project conducted a steelhead smolt-trapping project near the mouth of Trout Creek. The trapping yielded an estimate of 73,000 (+13,000 at the 95% CI) smolts (ODFW unpublished data). From this data it is easy to see that the Trout Creek sub-basin**



**provides spawning and rearing area for at least 25% of the wild summer steelhead above Sherars Falls.** For comparison, the best year for wild summer steelhead smolts estimated in the Hood River is only 30,000.

The Trout Creek habitat restoration project is an ongoing Deschutes Sub-basin restoration project. This offsite BPA mitigation project is designed to restore, improve, and/or maintain riparian and instream habitat, evaluate and monitor water delivery and withdrawal, and reduce the number of fish and habitat violations. With the goal of increasing the number of wild summer steelhead smolt outmigrants to 100,000 annually. An ancillary goal is to increase the resident redband trout, and pacific lamprey populations. Wildlife will also benefit from increased cover and forage along the improved riparian areas.

The Trout Creek Habitat Restoration project addresses several habitat and water related aspects. In the 1983 study of the Trout Creek sub-basin several habitat problems were identified as limiting steelhead and redband trout production. This included, 1) severe streambank erosion, 2) low stream shading, and elevated water temperature 3) poor pool cover. This is being addressed through the following:

### **1) Severe streambank erosion**

- ◆ Installed and maintain riparian exclosure fencing that has eliminated cattle grazing on 70 stream miles, and has helped to stabilize streambanks. 12 additional miles of stream protected from cattle grazing through riparian lease agreements. This provides protection on 68% of the currently available steelhead habitat.
- ◆ Installed and maintain juniper riprap on over 3.7 miles of eroding stream bank. Physically protecting 9% of identified eroding stream bank.
- ◆ In areas where bioengineering techniques were not feasible rock riprap was installed on 1,533 feet of stream bank. Physically protecting 0.7% of identified eroding stream bank
- ◆ 272 Rock jetties to deflect stream from highly erodeable areas.
- ◆ Created 11 off channel watering sites
- ◆ Avocation for other agencies to assist in correcting habitual problems (i.e. COE berms).
- ◆ Continued work and education with private landowners solve remaining problems.
- ◆ Increased law enforcement presence to deter environmental violations.

### **2) Low stream shading and elevated water temperature**

- ◆ This is being addressed mainly through cattle removal from riparian areas (see above) and promotion of hardwood growth.
- ◆ Water withdrawal amounts will be monitored to assure that water withdrawal corresponds with appropriate water right.
- ◆ Methods for water delivery will be reviewed and more efficient methods analyzed.

### **3) Poor pool cover and lack of habitat diversity**

- ◆ Installed 236 Rock weirs
- ◆ Installed 189 log weirs
- ◆ Installed 3,397 habitat boulders
- ◆ Installed 498 pieces of LWD
- ◆ Diversified habitat on 13% of available steelhead habitat.

There are several OSP reports of poaching of both adult and juvenile summer steelhead populations in the Trout Creek sub-basin. Several, verbal communications from officers in the field have stated the need to increase the patrols in the sub-basin due the high incidence of poaching violations. The reduction of

steelhead populations partially caused by the hydropower projects on the Columbia River has increased the importance of Trout Creek as a wild summer steelhead producer. To assist in reaching the smolt outmigration goal we feel it necessary to increase the law enforcement presence to reduce the existing problem and understand the magnitude of this problem.

Personnel from this project are involved in providing technical assistance for watershed restoration to private landowners and the Trout Creek Watershed Council as well as other NGO's that are providing, or attempting to provide watershed improvements in the Trout Creek Sub-basin. Also personnel from this project have been asked by the Trout Creek Watershed Council to take the lead in the development of the Long-Range Trout Creek Plan.

The related fish passage project (BPA #9306600) will start to address some of the fish passage issues, and this will provide us an opportunity to discuss with landowners methods of increasing efficiency in water delivery systems, and possibly consolidating water withdrawal sites. Personnel funded by this project will assist in identifying and implementing these opportunities. Also personnel funded by this project will assist and coordinate the augmentation of the current BPA habitat project through other granting sources.

With all the accomplishments to date there remains a large quantity of work to be accomplished in regard to instream and riparian restoration. Additional stream reaches need better livestock, and timber management. Sediment input from logging roads needs to be addressed, and several areas throughout the sub-basin are in need of additional habitat work. The greatest challenge to a significant recovery involves irrigation water withdrawal. Water withdrawal can significantly reduce stream flow in Trout Creek. This problem affects almost every stream in areas of the arid Western United States. This project proposes to increase monitoring of irrigation diversions and stream flows, and to assess the feasibility of higher efficiency water delivery systems. This project is necessary for several reasons:

1. Trout Creek provides 25-33% of the wild summer steelhead production in the Deschutes Sub-basin
2. Trout Creek is the largest East Side anadromous tributary to the Deschutes providing genetic diversity to an important East Side life history of wild summer steelhead.
3. A significant investment by BPA of over 4 million dollars had been spent in the Sub-basin. Protection of this investment through ongoing O&M is essential.
4. This type of restoration effort meets several criteria and goals stated in the 1994 FWP and in numerous IRSP recommendations.
5. Progress towards the goal of 100,000 smolts is occurring. Given USBR estimate of 250 adults (25,000 smolts) in 1981 and the trapping of 73,000 smolts in 1998 (using a 1% return, which is conservative for wild smolts) we are approaching the goal of 100,000 smolts.

**b. Rationale and significance to Regional Programs**

Trout Creek provides spawning and rearing habitat for up to 90% of the "east side" steelhead life history in the Deschutes River. This habitat is significant in maintaining the specific life history patterns of steelhead in the Deschutes River. This life history may have once been the most abundant life history when the Crooked River was available.

This program is designed to enhance wild summer steelhead in the Columbia Sub-basin. Habitat restoration of this type will help to avoid a steelhead listing in the Mid Columbia Sub-basin ESU.

This project is consistent with the following aspects of the 1994 FWP:

*Section 7.1 ensuring the biodiversity of the ecosystem, thereby sustaining the natural resources.*

This project is addressing ecosystem problems throughout the entire sub-basin. A majority of the recent work in this sub-basin has centered on the riparian or instream area. In eastern Oregon riparian area provide the highest level of biodiversity in the ecosystem. Maintaining and restoring this area is the first

step in ensuring the biodiversity. While the riparian areas are critical the Trout Creek Watershed council is working on farm plans that will address upland issues. ODFW and NRCS are currently educating landowners through presentations in front of the watershed council, and through the development of individual farm plans.

### *Section 7.1 and 7.1D.1 and 7.1D.2 Wild and naturally spawning population policy*

The very foundation of this project addresses the goal and intent of this section. The habitat restoration and protection of this native naturally reproducing salmonid population in the Trout Creek sub-basin will serve to enhance and protect the future of this population. It should also be noted that the 1998 steelhead smolt trapping yielded 73,000 smolts outmigrating from the Trout Creek Sub-basin. This represents a significant portion of the wild summer production in the entire Deschutes Sub-basin.

### *Section 7.6, 7.6A, 7.6A.2, 7.6B.1, 7.6B.2, 7.6B.3, 7.6B., 7.6B.4, 7.6B.5, 7.6B.6 Habitat goal, policies and objectives.*

This project's goal address all the objectives listed above. This project coordinates work with other agencies and has included the work in an overall framework for restoration over the entire sub-basin. The prime habitat in the sub-basin was identified and is already under protection by this project. Failure to continue this project will jeopardize the integrity of this prime habitat. The remaining habitat in this sub-basin is either being restored, or is waiting funding to address additional restoration projects. Projects are being developed and reviewed through the watershed council and other local landowners. Areas where restoration has a minimal chance for success has been delayed until higher priority projects have been completed. Cost sharing and additional funding sources, along with volunteer help has been explored and utilized.

### *Section 7.7 Cooperative habitat protection and improvement with private landowners.*

Since the majority of the restoration work to date and a majority of the entire watershed are in private ownership, this project from the inception has had to develop working relationships with private landowners. Through the watershed council private landowners ODFW, OSU extension, and other agencies meet on a monthly basis to discuss the approach and direction that habitat restoration needs to take.

This Project also relates to the following planning documents:

Edlund R. and C. Penhollow. 1996. Trout Creek Watershed Resource Inventory, Problem Assessment and Treatment Alternatives. Jefferson County Soil and Water Conservation District. 46-84.

Columbia River Intertribal Fish Commission. 1996. Wy-Kan-Ush-Mi Wa-Kish-Wit Spirit of the Salmon The Columbia River Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs, and Yakima Tribes. Volume II p38.

Oregon Department of Fish and Wildlife. 1997. Lower Deschutes River Sub-basin Management Plan. 1-24-5 and 1-34

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Northwest Biological Consulting 1983. Trout Creek Restoration. Project No. 83-423. Phase 1 Final Report. Bonneville Power Administration, Portland, Oregon. p15-18

### **c. Relationships to other projects**

This project will help to coordinate and develop additional projects with several NGO's and various other state and federal agencies (i.e. Oregon Trout, SWCD, Trout Creek Watershed Council, BOR, Water Resources, OSP, DOF, BLM, USFS, Corps of Engineers, et.al.). Also there are additional projects that have

been jointly developed with the Trout Creek Watershed Council, SWCD, and ODFW. Our manpower and technical expertise has been instrumental in assisting the development of further restoration efforts in the sub-basin.

The Oregon Screens project (#9306600) is responsible for the removal of fish passage barriers in the sub-basin. All construction, supervision, and labor for the removal and installation of these structures are based out of this office. The technical expertise and sharing of equipment from the Trout Creek Restoration project has been instrumental in the execution of this project.

This project works with and shares resources with the Fifteenmile Habitat Restoration Project, and the Oregon Screens Project (Project #9306600). Personnel, equipment, facilities, and expertise from the Trout Creek Habitat project and the Mitchell Act project are utilized in execution of these two projects.

The Buckhollow project (9303000) strives to accomplish the same goals as this project, but is fundamentally separate from the execution of this project.

**d. Project history** (for ongoing projects)

The Trout Creek project began in 1982. The first phase of the project was a survey of the entire sub-basin to determine the feasibility of restoration efforts in the sub-basin. The survey analyzed cost/benefit ratios and habitat enhancement possibilities. Due to excessive costs it was determined that Antelope Creek above Ward Creek and all of Hay Creek would not be addressed under this project. A plan for habitat restoration in the remaining Trout Creek sub-basin was developed. On the ground construction began in 1986, and continued until about 1991. Since 1993 the project has concentrated on maintaining the existing work. . To date this project has accomplished:

**Riparian Exclosure Fencing**

Total Miles Riparian Fencing	132
Miles of Stream Fenced	70

**Instream Structures**

Rock Jetties	272
Rock RipRap	1,533 ln. ft.
Juniper RipRap	18,110 ln. ft.
Rock Weir	236
Log Weir	189
Habitat Boulders	3,353
Large Woody Debris (LWD)	498
Spring Development	11

This only lists the work that this project has put on the ground. In 1998 there was a sub-basin wide stream survey to assess the habitat changes that have occurred in the sub-basin. This will start to give empirical evidence to the physical changes on the project. And will verify the visual recovery observed in the photo points.

Quantifiable smolt trapping was conducted in the sub-basin for the first time since the inception of this project. Results from this trapping reiterated the importance of the Trout Creek Sub-basin to the Deschutes sub-basin. There were an estimated 73,000 smolts captured which accounts for an estimated 20-33% of the total production in the Deschutes sub-basin.

ODFW and other agencies that are involved with the watershed council and/or have assisted in on the ground projects include: Oregon Trout, Oregon Water Trust, Jefferson County SWCD, ODFW Restoration and Enhancement, ODFW Access and Habitat, Bureau of Reclamation, Governor's Watershed Enhancement Board, US Forest Service, National Marine Fisheries Service - Mitchell Act Funds.

**e. Proposal objectives**

- 1) Promote bank stability and vegetation regrowth to allow the continued upward trend in riparian and instream habitat. With the goal of attaining healthy riparian vegetation on at least 90% of the perennial stream miles, achieve <10% active stream bank erosion, and decrease maximum summer water temperature to 68°F or less at the mouth of Trout Creek.
- 2) Remove passage barriers for adult and juvenile summer steelhead to achieve full utilization of suitable habitat.
- 3) Increase habitat diversity by increasing pool habitat to historical levels.
- 4) Provide technical assistance to landowners to reduce the amount of sediment delivery from upland sources.
- 5) Achieve water quality standards that will comply with the clean water act, or assist in establishing a plan that will bring the sub-basin into compliance.
- 6) Achieve a better understanding of the water usage throughout the sub-basin.
- 7) Reduce the amount of illegal harvest of salmonids, and reduce habitat related violations.
- 8) Determine sub-basin and sub-basin summer steelhead smolt out migration.
- 9) Develop long range restoration plan for the Trout Creek Sub-basin.

**f. Methods**

*Objective 1* Livestock grazing has been perhaps the most prevalent cause of ecological degradation for many western riparian and stream ecosystems (Kauffman and Krueger 1984, Kauffman 1988, Fleischner 1994). There are several reports and journal articles that indicate improper cattle grazing as one of the most destructive impacts on stream morphology, water quality, sedimentation, and riparian vegetation (Ames 1977, Behnke and Raleigh, 1978, Bryant 1972, Davis 1982, Evans and Krebs 1977, Everest and Meehan 1981, Gunderson 1968, Johnson 1978, Knoph and Cannon 1982, Marcuson 1977, Oregon and Washington Interagency Council 1978, Platts 1979, Platts 1981, Pond, 1961, Rauzi and Hanson 1966). After extensive field reviews of fish habitat improvement projects in eastern Oregon Beschta et. al. (1991) and Kauffman et al. (1993) concluded that the cessation of livestock grazing in riparian zones in eastern Oregon was the single most ecologically effective approach to restoring salmonid habitats. To maintain and continue the upward trend in the riparian conditions throughout the BPA riparian leased areas we will continue to maintain and inspect existing riparian corridor fencing at least biannually. Depending on livestock use, wildlife, weather, or other factors we will inspect riparian fences up to once a week. Repair to damaged fence will be completed as soon as feasible. Additional work will be done on areas outside the fenced or leased area by working with private landowners, nongovernmental organizations (NGO), and the Trout Creek Watershed Council to develop projects, locate additional

funding sources, and address the remaining stream miles that need restoration. Development of a watershed wide habitat/restoration priority list is currently being developed. This will help in directing future projects to further enhance summer steelhead and resident redband trout populations in the sub-basin.

The 1998 stream physical habitat survey of the project area in the sub-basin will assess the progress towards measurable objectives. Results from the 1998 stream physical habitat survey will determine progress and direction needed to meet measurable goals. Work will continue with private landowners, NGO's and the Trout Creek Watershed Council to develop strategies to address areas outside BPA riparian leased ground.

Work conducted by water resources regarding the measurement of the amount and timing of water withdrawal along with stream flows will also assist in potential future stream augmentation.

The above actions will serve to lower stream summer temperatures and sedimentation by 1) increasing stream side vegetation 2) reducing stream bank erosion and sediment input to the stream 3) locating areas of irrigation efficiency.

*Objective 2* Work with private landowners to find mutually agreeable ways of removing gravel push up dams. Installation of these structures will benefit the system in two ways. One, it will remove fish passage problems that begin with the annual installation of gravel push up dams. Second, it will assist the recovery of the riparian and instream habitat surrounding these structures by eliminating the annual bulldozing that occurs at the point of diversion. This will benefit the seasonal movement of juvenile steelhead within the sub-basin.

*Objective 3* The objective of past instream restoration was to add scour points to increase the amount of pools in the sub-basin to more closely match the historical levels, and to provide more diverse instream habitat. Monitoring of these structures will continue on an annual basis. Results from the 1998 survey will help in determining progress towards diversifying instream habitat.

*Objective 4* Work with private landowners, NGO's, SWCD and the Trout Creek Watershed Council to develop strategies to address upland areas. Assess with SWCD farm plan the amount of range land in poor condition. Develop strategies to help move poor upland conditions to good condition by promotion of perennial grasses.

*Objective 5* Temperature and sediment levels are currently exceeding state water quality standards. The method for bringing these parameters into compliance is centered around the habitat protection stated in the first four objectives. When more advanced monitoring and sampling occurs additional standards might be out of compliance. Adaptive management policies will be able to react to this possible scenario.

*Objective 6* Water usage will be monitored to ensure that the use is consistent with appropriate water rights. If an existing water right is transferred or leased to instream purposes, the instream water right will be protected consistent with the relative priority of other rights calling on the stream. Increasing efficiency of current water delivery systems will be explored and alternatives for assisting water users will be identified.

*Objective 7* Reduction of the illegal harvest of adult and smolting steelhead and habitat violations will be accomplished through an enhanced presence of OSP game officers. In addition to increased patrols through the area aerial and covert tactics will be employed based on the recommendations of OSP.

*Objective 8* Operate smolt traps in several locations in the sub-basin to confirm areas of critical habitat, and/or locate new areas critical to summer steelhead production.

*Objective 9* In 1998 the Trout Creek Project conducted a habitat survey of the Trout Creek Sub-basin. The survey is a modified Hankin and Reeves survey protocol. This protocol has been used through out the state. The parameters that will be surveyed include stream reach characteristics such as; channel form, valley form, vegetation class, and land use, and channel unit typing, instream cover, substrate, stream shade, and unit size measurements. Information will be compared to the information from the 1994 Buell and Associates to determine the impact that this project has brought to the sub-basin. This survey will assist in the direction of future restoration efforts. Existing areas that are currently highly productive for salmonid spawning and rearing will be identified and if current protection efforts are inadequate then additional protective measures can be undertaken. Information will also help in assessing the amount of positive instream habitat changes that the current habitat mitigation project has fostered. Finally, the survey information will assist the Trout Creek Watershed council to address areas where there needs to be a focus on future habitat projects in the sub-basin.

**g. Facilities and equipment**

Facilities:

Office space 800 sqft  
Shop space 700 sqft  
Yard space 3000 sqft

Of this space BPA only pays for ½,. Federal Mitchell Act picks up remainder.

Equipment

3 Vehicles (2 - ¾ ton trucks, 1 Suburban)  
3 ATV's (1986 Honda, 1987 Yamaha, 1986 Polaris)  
2 Computers (1 486 66Mhz IBM and 1 PII266Mhz)  
2 Printers  
Wood post driver  
Rock drill  
Power Auger  
Camera

**h. Budget**

There are three reasons for the increase in requested funding for the year 2000.

- 1) Increase in the indirect rate from 22.9% to 35.5%. This increases our budget by over \$31,000.
- 2) One time capital purchase of:
  - a) One ATV to replace two old machines that have become excessively expensive to maintain, and consistently breakdown in the field.
  - b) Five Solar Pumps to replace water gaps where annual maintenance costs are excessive.
- 3) Increase in the monitoring and evaluation aspect of the project.

## **Personnel**

### *Monitoring and Evaluation -*

- 1) Stream temperature monitoring personnel time for deployment and recovery of data collection gear and data organization (3 person weeks/yr.).
- 2) Smolt trapping operations personnel time for 3.5 months of trap operation, smolt processing, data entry, and report writing ( 6 person months/yr.)

### *Long Range Planning -*

- 1) Personnel time for coordination and direction of the Trout Creek Sub-basin long-range plan (2-person months/yr.).

## **Fringe Benefits**

- 1) Other personnel expense(OPE) related to above personnel needs. Figured at 39% of base salary.

## **Supplies, Materials, Nonexpendable Property**

- 1) Equipment and Supplies related to the stream temperature monitoring and smolt trapping operations.

## **Operations and Maintenance**

- 1) This line covers all expense related to the operation and maintenance of all the habitat work that this project has completed over the past 15 years. Under this line item personnel services, and OPE make up \$153,094. Supplies and services (office, vehicles, fence supplies, etc.) consist of \$31,711. The Trout Creek project's O&M costs are lower than all other habitat improvement projects in the Columbia River Sub-basin relative to the amount of dollars per mile of fence maintained, and dollars per mile of stream restored

## **Capital Acquisitions or Improvements**

- 1) 5 solar pumps will be installed at currently used water gaps. These will not only remove high concentration cattle from the stream, but will also decrease the amount of time required to maintain the water gap. (5 @ \$3,500each)
- 2) One new ATV will be purchased to replace the two old machines currently in use. Existing ATV's were purchased in 1986 and 1987. The current machines have served well, but years of use in rugged country have taken their toll. Currently (1998) over \$1,500 is being spent annually to keep these machines in operation. This does not count lost time in the field breakdowns to recover machine from remote locations and wasted time in shop repair.

## **Indirect Costs**

- 1) The indirect rate has increased from 22.9% to 35.5%.



## Section 9. Key personnel

Personnel	Title	Department	FTE
Alan (Chip) R. Dale	Special Programs Leader	ODFW	0.08

### Education

1986 Colorado State University, Fort Collins, CO.  
Degree: MS in Wildlife Biology

1977 Colorado State University, Fort Collins, CO.  
Degree: BS in Wildlife Biology

### Training

AFS Habitat Workshop, Bellevue, WA. 1991  
State of Oregon DAS Core Curriculum for Managers and Supervisors.  
USFS GAWS Aquatic Habitat Inventory.

### Experience

1993 – Present, Oregon Department of Fish and Wildlife Assistant  
Regional Supervisor (Fisheries).

### **Duties**

Administer the fisheries resources of the High Desert Region of ODFW.  
Programs include research, habitat, Fisheries, and Propagation.  
Administer Programs involving ~60 FTE's and ~\$3.5 million dollar  
budget.

1983-1990 Denver Water Department, Environmental Planner.

### **Duties**

Responsible for planning and implementation of habitat restoration projects for  
mitigation for mitigation of impacts related to dam construction. Also oversaw inventory  
programs conducted jointly with Colorado Division of Wildlife to measure fish  
population abundance in impacted reaches of rivers affected by Denver Water District's  
operations.

### **Publications**

Dale, A. R. and J. A. Bailey. 1982. Application of optimal foraging theory for bighorn  
sheep habitat analysis. Proc. 3<sup>rd</sup> Bienn. Symp. North Wild Sheep and Goat Council. Pp  
254-264.

Chilcote, M., K. Kostow, H. Weeks, H. Schaller, and A. Dale. 1991. First Biennial  
Report on Status of Oregon's Wild Fish Populations. ODFW.

**Ray Hartlerode****Project leader****ODFW****0.33**Education

1979 – 1983 Oregon State University; Corvallis, Oregon  
Degree: B.S. in Fisheries Science

Training

AFS Riparian Restoration Workshop  
NMFS Fish Passage and Diversion Structures Training  
State of Oregon DAS Core Curriculum Training for Managers and Supervisors  
Northwest Fish Screening and Passage Workshops

Experience

1991-Present, Oregon Department of Fish & Wildlife; Project Leader on Fifteenmile, Trout, and Buckhollow Creek Habitat Restoration Projects. Project Leader on N.E. Oregon Screens Trout Creek Passage Project, Project Leader for NMFS Mitchell Act Fifteenmile/Trout Creek Fish Screens Project.

Duties

Fiscal management of project budgets. Supervision of project personnel to implement and maintain fish habitat projects. Preparation of proposals, works statements, contracts, leases, and reports. Coordination of habitat projects with other agencies and organizations performing conservation programs in the watershed. Identify stream reaches with altered habitat conditions that lack necessary habitat types to sustain natural production of fish populations. Determine appropriate fish habitat restoration and improvement actions. Negotiates with government and private landowners for cooperation and permission to conduct habitat restoration projects. Develop program direction in the form of standards and guides for all regional habitat programs; including, but not limited to, Bonneville Power Administration (BPA) National Marine Fisheries Service (NMFS) and state funded fish habitat and screening projects.

1987-1991 – Oregon Department of Fish & Wildlife. Assistant Project Leader, Trout Creek Habitat Restoration Project

Duties

Conducted fish habitat surveys, recommended habitat restoration treatments, developed habitat restoration construction contracts, inspected construction contracts, negotiated landowner riparian leases, wrote landowner riparian leases., performed maintenance on riparian improvements such as riparian fencing and instream habitat structures.

**Tom Nelson****Assistant Project Leader****ODFW****0.75**Education

1984 – 1989 Oregon State University; Corvallis, Oregon  
Degree: B.S. Agricultural Resource Economics

1993 – 1994 Oregon State University; Corvallis, Oregon  
1 year masters level fisheries coursework

Training

Northwest Fish Screening and Passage Workshops

Proper Functioning Condition Workshop  
ODFW and USFS stream survey training

Experience

April 1997-Present, Oregon Department of Fish & Wildlife; Assistant Project Leader on Trout Creek Habitat Restoration Project

Duties

Fiscal management of project budgets. Supervision of project personnel to implement and maintain fish habitat projects. Preparation of proposals, works statements, contracts, leases, and reports. Coordinates habitat work with private landowners. Educates and informs private landowners as to best management practices in and along streams. Coordination of habitat projects with other agencies and organizations performing conservation programs in the watershed. Identify stream reaches with altered habitat conditions that lack necessary habitat types to sustain natural production of fish populations. Determines appropriate fish habitat restoration and improvement actions. Negotiates with government and private landowners for cooperation and permission to conduct habitat restoration projects. Develop habitat restoration construction contracts. Inspected construction contracts. Performed maintenance on riparian improvements such as riparian fencing and instream habitat structures

April 1996- April 1997 Oregon Department of Fish & Wildlife Prineville District Acting Assistant District Fish Biologist and Restoration and Enhancement Coordinator.

Duties

Fiscal management of project budgets, preparation of proposals, contracts, and reports, coordinates habitat work with private landowners, educates and informs private landowners as to best management practices in and along streams, coordination of habitat projects with other agencies and organizations performing conservation programs in the watershed. Identifies stream reaches with altered habitat conditions that lack necessary habitat types to sustain natural production of fish populations. Determine appropriate fish habitat restoration/improvement actions. Negotiates with government and private landowners for cooperation and permission to conduct habitat restoration projects. Conducted fish inventories, and evaluated fish stocking levels and timing on district waterbodies. Conducted and evaluated fish distribution, and population surveys.

April 1995 – April 1996 Oregon Department of Fish & Wildlife Restoration and Enhancement Coordinator.

Duties

Fiscal management of habitat project budgets, preparation of proposals, contracts, and reports, coordinates habitat work with private landowners, educates and informs private landowners as to best management practices in and along streams, coordination of habitat projects with other agencies and organizations performing conservation programs in the watershed. Identifies stream reaches with altered habitat conditions that lack necessary habitat types to sustain natural production of fish populations, determines appropriate fish habitat restoration/improvement actions, negotiates with government and private landowners for cooperation and permission to conduct habitat restoration projects.

May 1992 - November 1994 USFS Ochoco National Forest (seasonal)  
Fisheries Technician

Duties

Conducted, three different levels of stream surveys, analyzed, data and made recommendations. Conducted, supervised and analyzed data on a fish composition and

density study on the North Fork of the Crooked River, Assisted OSU masters student on a redband/steelhead microhabitat utilization study.

## **Section 10. Information/technology transfer**

Technical information from the 1998 physical stream habitat survey and the 1998 SST smolt trapping information report will be made available to the Trout Creek Watershed council and to all interested parties.

## **Congratulations!**